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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/540,491

03/21/2006

Paolo Minzioni

05788.0369

3561

22852

7590

05/16/2008

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EXAMINER

BOLDA, ERIC L

ART UNIT

PAPER NUMBER

3663

MAIL DATE

DELIVERY MODE

05/16/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/540,491	<b>Applicant(s)</b> MINZIONI ET AL.	
	<b>Examiner</b> ERIC BOLDA	<b>Art Unit</b> 3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 March 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 24-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/21/2006</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of invention I, in the reply filed on March 14, 2008 is acknowledged. Claims 14-23 read on the elected invention.

### ***Claim Objections***

2. Claim 14 is objected to because of the following informalities: there is a comma missing between the words "length" and "said" on line10 of the claim. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 14, and claims 15-23 dependent on it, are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites "an optical phase conjugation device associated to an amplifier of said plurality of amplifiers;" and a further optical amplifier associated to said optical fiber length said optical fiber length having.." It is unclear in these instances how the components (optical phase conjugation device and amplifier, and optical fiber length and further optical amplifier) are associated. The examiner interprets the claim broadly to mean that these additional components are optically connected; however the exact structural configuration remains unknown.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 14-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Watanabe (US 6,175,435) (cited in applicant's IDS filed March, 21, 2006).

With regard to claim 14, Watanabe discloses in Fig. 7 an optical system comprising

- An optical fiber path (from transmitter to receiver)
- A plurality of optical line amplifiers (A1-1),(A1-2)..(A1-N) and (A2-1), (A2-2)..(A2-N) disposed along the optical fiber path, dividing the optical fiber path into spans of optical fiber (IS1),(1S2), (IC1),(IC2), etc. including at least one transmission optical fiber having an effective length  $L_{eff}$
- An optical phase conjugation device (6) connected after an optical amplifier (A1-N)
- An optical fiber length disposed upstream from the optical phase conjugation device, e. g. (I1)

The optical fiber IS2 etc. have the same sign of dispersion of the the transmission fiber, i. e. negative (12col. lines 5-11). This is also evident from the requirement that the ratio of the dispersion of the first fiber to the dispersion of the second fiber is equal to the ratio of the length of the second fiber to the length of the first

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fiber. (13<sup>th</sup> col. lines 14-21, 11<sup>th</sup> col. lines 56-59). The clause "adapted for introducing an accumulated dispersion between 0.6 and 1.5 times a dispersion accumulated in an effective length  $L_{\text{eff}}$  of said transmission fiber" is essentially a statement of intended or desired use. Thus, these claims as well as other statements of intended use do not serve to patentably distinguish the claimed structure over that of the reference. See MPEP § 2114. In this case, the optical fiber length introduces an accumulated dispersion of approximately 1.0 times a dispersion accumulated in an effective length of the transmission optical fiber, as follows from Equation (22).

With regard to claims 15, 16, and 22, the dispersion coefficient of one fiber is -0.3ps/nm/km while that of the other is -30 ps/nm/km (12<sup>th</sup> col. lines 5-8).

Therefore the absolute value of the dispersion coefficient of one is higher than three times the dispersion coefficient of the other, and is higher than 0.5 ps/nm/km.

With regard to claim 17, the amplifiers comprise erbium-doped fiber amplifiers (11<sup>th</sup> col. lines 4-6).

With regard to claim 19, Fig. 8 discloses a further embodiment with the limitations of claim 1, and in addition, that the product of nonlinear coefficient (index of refraction), the intensity in a fiber and the length of a fiber, is equal to the product of nonlinear coefficient (index of refraction), the intensity in a fiber and the length of a second fiber (Equation (25), 13<sup>th</sup> col. lines 46-54). Since the light intensity is approximately equal for two of the fibers (when amplification is taken into account), this implies that the fiber with a shorter length must have a higher nonlinear coefficient.

With regard to claims 20-21, the optical fiber lengths are chose to introduce dispersion approximately equally (Equation (22)).

With regard to claim 23, the system further comprises a transmitting station (2) at the input end and a receiving station (4) and the output end of the optical fiber path.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe as applied to claim 14 above and further in view of Wang et al. (US 2002/0149838). Watanabe does not disclose that the further optical amplifier associated with the optical phase conjugation device. However, Wang teaches in Fig. 6 an optical amplification system with a plurality of optical line amplifiers dispose along an optical fiber path, comprising at least one amplifier (Bi) with an amplification that is higher, and therefore an output power is higher, that the average output power of the plurality of amplifiers along the line (para.[0040]). It would have been obvious to one skilled in the art (e. g. an optical engineer) to choose at least one optical line amplifier e. g. the amplifier associated with the phase conjugation device in the system of Watanabe, to have a higher output power, for the advantage of providing flat output spectrum (Abstract).

***Information Disclosure Statement***

9. The information disclosure statement filed on March 21, 2008 has been considered by the Examiner.

***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Watanabe.

11. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Eric Bolda whose telephone number is 571-272-8104. The examiner can normally be reached on M-F from 8:30am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Jack Keith, can be reached on 571-272-6878. Please note the fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Eric Bolda/

Primary Examiner, Art Unit 3663

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